

ENVIRONMENTAL ASSESSMENT

Magma Energy (U.S.) Corp.

McCoy II Geothermal

Exploration Project

NVN-88129X

DOI-BLM-NV-C010-2011-0514-EA

U.S. Department of the Interior
Bureau of Land Management
Carson City District
Stillwater Field Office
5665 Morgan Mill Road
Carson City, NV 89701
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It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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LIST OF ACRONYMS & ABBREVIATIONS

ARPA	Archaeological Resources Protection Act of 1979
BLM	Bureau of Land Management
CRMP	Consolidated Resource Management Plan
°C	Degrees Celsius
EA	Environmental Assessment
EPMs	Environmental Protection Measures
FAA	Federal Aviation Administration
FLPMA	Federal Land Policy and Management Act
HMA	Herd Management Area
IM	Instructional Memorandum
Magma	Magma Energy (U.S.) Corp.
MBTA	Migratory Bird Treaty Act of 1918
NDOM	Nevada Division of Minerals
NDOW	Nevada Department of Wildlife
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NRHP	National Register of Historic Places
OHV	Off-Highway Vehicle
Project Area	McCoy II Unit Lease Area

**ENVIRONMENTAL ASSESSMENT
MCCOY II GEOTHERMAL EXPLORATION PROJECT
MAGMA ENERGY (U.S.) CORP.**

1.0 INTRODUCTION/PURPOSE AND NEED

The Bureau of Land Management (BLM), Carson City District Office has prepared this Environmental Assessment (EA) to analyze potential impacts to the human and natural environment that may result from exploratory drilling for geothermal resources within the Magma Energy (U.S.) Corp. (Magma) McCoy II Unit Lease Area (NVN-88129X) (project area) near Austin, Nevada (Figure 1). The project area is located on federal geothermal leases in the Edwards Creek Lease Area (NVN-85725, NVN-85726, NVN-85727, and NVN-86905), on public lands managed by the BLM Carson City District, Stillwater Field Office. The BLM manages the subsurface geothermal resources for this project and is also the surface management agency (Figure 2). Portions of leases NVN-85725, NVN-85726, and NVN-89605 are located in Lander County outside of the Stillwater Field Office. Only the portions of these leases within the Stillwater Field Office jurisdiction are being proposed for exploration. Access to the project area would be from Highway 50 through the existing road system to the project area.

Magma is seeking BLM approval to drill temperature gradient wells; observation wells; and production/injection wells at 19 drill pad locations. Table 1 shows the drill pad identification letter, Kettleman number, and location information for each proposed drill pad (see Figure 3). Wellbores may be drilled vertical or directionally depending on the orientation of the target, and multiple wells may be drilled from a single pad.

Table 1 Proposed Drill Pads

Drill Pad Identification	Kettleman Number	Township/Range	Section Number	UTM Coordinates (NAD 83)	
				Easting (m)	Northing (m)
A	17-20	T 23N / R 40E	20	456092	4410347
B	42-29	T 23N / R 40E	29	456772	4409716
C	13-29	T23N / R 40E	29	456289	4409615
D	38-29	T 23N / R 40E	29	456473	4408630
E	44-31	T 23N / R 40E	31	455106	4407801
F	57-32	T 23N / R 40E	32	456811	4407187
I	51-5	T 22N / R 40E	5	456958	4406730
J	18-5	T 22N / R 40E	5	456133	4405391
K	67-5	T 22N / R 40E	5	456974	4405618
M	62-8	T 22N / R 40E	8	457135	4405005
N	18-8	T 22N / R 40E	8	456127	4403719
O	57-8	T 22N / R 40E	8	456842	4403884
P	64-18	T 22N / R 40E	18	455485	4402974

Drill Pad Identification	Kettleman Number	Township/Range	Section Number	UTM Coordinates (NAD 83)	
				Easting (m)	Northing (m)
Q	44-17	T 22N / R 40E	17	456800	4402908
R	48-18	T 22N / R 40E	18	455212	4402227
S	58-17	T 22N / R 40E	17	456897	4402341
T	65-19	T 22N / R 40E	19	455470	4401175
W	85-32	T 23N / R 40E	32	457476	4407554
X	88-30	T 23N / R 40E	30	455989	4408588

Source: Magma Energy (U.S) Corp., 2010

The Department of the Interior, consistent with Section 2 of the Mining and Mineral Policy Act of 1970 and Sections 102(a)(7), (8), and (12) of the Federal Land Policy and Management Act of 1976 (FLPMA), encourages the development of mineral resources, including geothermal resources, on federal lands. The Geothermal Steam Act of 1970 (30 USC §1001 et seq.) and its implementing regulations (43 CFR Part 3200) provide regulatory guidance for geothermal leasing by the BLM. These regulations identify four stages of geothermal resource development within a lease: (1) exploration, (2) development, (3) production, and (4) closeout. Each of the four stages under the lease requires separate BLM authorization and compliance with the National Environmental Policy Act of 1969 (NEPA) when ground-disturbing activities are proposed.

A geothermal lease typically grants the lessee access to geothermal resources in the lease area for a period of 10 years. The terms of the lease require the lessee to show a certain level of diligence toward developing the geothermal resources within the lease area or the lease may be terminated. Once an area is developed for productive use of geothermal energy, the lease allows the lessee use of the resource for 40 years, with a right of renewal for another 40 years. Geothermal exploration and production on federal land conducted through leases is subject to terms and stipulations to comply with all applicable federal, state, and local laws and regulations pertaining to sanitation, water quality, wildlife, safety, and reclamation (Appendix A). Lease stipulations may be site-specific and are derived from the environmental analysis process. This EA considers the potential environmental impacts of the Proposed Action and has been prepared in accordance with NEPA, the Council on Environmental Quality regulations implementing NEPA, and FLPMA.

The McCoy geothermal area was discovered in 1977 and was made a part of the Department of Energy Geothermal Reservoir Assessment Case Study Program in 1978. Exploration drilling resulted in 52 shallow temperature gradient wells and five intermediate depth temperature gradient wells. Data from these wells and geophysical studies defined a thermal anomaly of the 200 degrees Celsius (°C) isotherm at the projected depth of 6,500 feet, and covers an area of 35 square miles, which is among the largest in the basin and range. Fluids at 100°C were

encountered in a drill hole in the southern part of the prospect. Olson et al. (1979) reported, that based on geothermometer calculations using the dilution-corrected model of Dellechaie (1977 & 1978), the minimum equilibration temperature anticipated from the McCoy geothermal reservoir is 186°C. The Amax geothermal exploration holes produced temperature gradients of 100°C per kilometer to more than 250°C per kilometer (Garside and Schilling, 1979).

1.1 PURPOSE AND NEED

The purpose of the Proposed Action is to explore for potential resources of geothermal fluid minerals. The need for the Proposed Action is established by the BLM's responsibility under the Geothermal Steam Act of 1970; the regulations under 43 CFR 3270; the Minerals Leasing Act of 1920, as amended; and Secretarial Order 3285 A I of February 22, 2010.

1.2 LAND USE PLAN CONFORMANCE STATEMENT

The Proposed Action and alternatives described below are in conformance with the Carson City District Office Consolidated Resource Management Plan (CRMP). The desired outcome for minerals and energy management under the CRMP is to “encourage development of energy and mineral resources in a timely manner to meet national, regional, and local needs consistent with the objectives for other public land uses” (BLM, 2001). The CRMP minerals and energy management direction applies the following restriction on geothermal leasing: “no surface occupancy within 500 feet of any water” (BLM, 2001).

The Proposed Action is consistent with State of Nevada, Churchill County, ordinances, policies, and plans.

1.3 PLANS, STATUTES, AND OTHER REGULATIONS

The Proposed Action is consistent with federal laws and regulations; plans, programs, and policies of affiliated tribes, other federal agencies, state, and local government. Specific approvals, permits, and regulatory requirements would apply for constructing, testing, and maintaining the Proposed Action. Table 2 lists federal, state, and local permits, policies, and actions that may be required as part of the Proposed Action.

Table 2 Potential Regulatory Responsibilities

Regulatory Agency	Authorizing Action
BLM	Geothermal Drilling Permits and NOI's
Department of Conservation and Natural Resources, Nevada Division of Water Resources	Water Use Permitting
State of Nevada, Commission on Mineral Resources, Division of Minerals (NDOM)	Geothermal exploration and production well permits
Nevada Department of Environmental Protection, Underground Injection Control	Injection Well Permitting

2.0 PROPOSED ACTION AND ALTERNATIVES

Magma proposes to conduct exploration activities within the project area located approximately 80 miles east of Fallon, Nevada in Churchill County (Figure 1). This chapter describes the Proposed Action and the No Action Alternative being analyzed in this EA. The McCoy II Unit Agreement between Magma and BLM was approved on July 1, 2010 (NVN-88129X). Table 3 shows the geothermal leases included in the McCoy II Unit, legal descriptions of the leases included in the Unit, and the effective dates of the leases. The total area of the Unit is approximately 12,058 acres (Figure 2).

Table 3 McCoy II Unit BLM Geothermal Leases

Lease Number	Legal Description, all Mount Diablo Meridian	Effective Date
NVN-85725*	Sections 4 (Lots 1-4; S2; S2N2) & 5 (Lots 1-4; S2; S2N2), T22N, R40E Sections 28, 29, 31 (Lots 1-4; E2; E2W2), & 32, T23N, R40E	09/01/2008
NVN-85726*	Sections 6 (Lots 1-7; S2NE; SENW; E2SW; SE), 7 (Lots 1-4; E2; E2W2), 8, 9, 17, 18 (Lots 1-4; E2; E2W2), & 19 (Lots 1-4; E2; E2W2), T22N, R40E	09/01/2008
NVN-85727	Sections 20 & 21, T23N, R40E	09/01/2008
NVN-86905*	Sections 19 (Lots 1-4; E2; E2W2) & 30 (Lots 1-4; E2; E2W2), T23N, R40E Section 20, T22N, R40E	09/01/2009

* Portions of leases are located in Lander County outside of the Stillwater Field Office jurisdiction.

2.1 PROPOSED ACTION

The Proposed Action consists of temperature gradient well drilling, observation well drilling, production/injection well drilling, and construction and improvement of access roads and drill pads. Up to two new production wells, up to three temperature gradient wells, and up to three observation wells would be drilled at each pad location. Wellbores may be drilled vertical or directionally depending on the orientation of the target. Some directional drilling may result in the surface location being on a federal-lease or private fee land and the hole bottom location being on the opposite type of property. This information would be disclosed when Magma applies with the BLM for a geothermal drilling permit. A geothermal drilling permit is required to be submitted and approved by the BLM prior to drilling each well.

The Proposed Action includes the reclamation of exploration disturbance. Figure 3 shows the location of the proposed drill pads in the project area and the proposed access roads, along with existing roads in the area.

The project area can be accessed by traveling east from Fallon, Nevada approximately 80 miles on Highway 50 then turning north on an unnamed gravel road, or west from Austin on Highway 50 approximately 30 miles. The project area is located approximately 11 miles north of Highway 50. Existing roads would serve as the main transportation corridors from Highway 50 to the proposed project area. Existing roads would only be improved where indicated in Table

4. Any additional improvements of existing roads are not analyzed in this EA and would require surveys such as cultural, and a new NEPA analysis. These roads would apply standard design criteria, per the Gold Book (BLM, 2007) surface operating standards and guidelines for oil and gas, on a site-specific basis, which would reduce unnecessary impacts. Access roads would be 15 feet wide. Side roads to drill pads would be improved only where necessary to accommodate equipment passage. Approximately 5.1 miles of new roads would be constructed to access pads B, C, D, E, F, I, J, K, P, Q, R, S, T, and X (Figure 3). An additional 10 miles (52,849 feet) of existing road would be improved as needed. Pads that are not in active use would be used as staging and storage areas during exploration drilling operations. Table 4 provides the expected acres of disturbance associated with pad and road construction.

Table 4 Ground Disturbance

Site	Ground Disturbance per Site (acres) ¹	Length of New or Improved Road (feet) ²	Ground Disturbance per New Road (acres)	Total Area of Disturbance
A	2.07	0	0.00	2.07
B	2.07	2,122	0.73	2.80
C	2.07	1,372	0.47	2.54
D	2.07	1,141	0.39	2.46
E	2.07	1,799	0.62	2.69
F	2.07	1,264	0.44	2.51
I	2.07	3,401	1.17	3.24
J	2.07	3,489	1.20	3.27
K	2.07	1,852	0.64	2.71
M	2.07	0	0.00	2.07
N	2.07	0	0.00	2.07
O	2.07	0	0.00	2.07
P	2.07	324	0.11	2.18
Q	2.07	3,826	1.32	3.39
R	2.07	1,684	0.58	2.65
S	2.07	1,691	0.58	2.65
T	2.07	6,004	2.07	4.14
W	2.07	0	0.00	2.07
X	2.07	3,393	1.17	3.24
Road Improvements		52,849	18.20	18.20
Total	39.33	86,211	29.69	69.02

¹ Includes sump and pad disturbance

²Roads would be 15 feet wide, and no improvement of existing roads would take place other than where indicated in this table. If improvement of roads is necessary new surveys and a new NEPA analysis would be conducted for that disturbance.

2.1.1 Exploratory Drilling and Testing

Exploratory drilling operations would be conducted on constructed drill pads with dimensions of approximately 300 feet by 300 feet at each drilling location (Figure 3). Sumps would be required for all wells, dimensions of sumps for drill cuttings, should they be necessary, would be up to 200 feet by 60 feet by 10 feet deep. Figure 4 shows a typical drill pad layout for the drilling rig, reserve pits, pumps, parking, storage, and other drilling fluid treatment apparatus.

The shape and layout of the pads may be adjusted within the area that has been culturally cleared in order to account for topographic and drainage features and to aid in diversion runoff, but the total disturbance acreage would stay the same. Diesel for use in equipment would be stored on-site in proper containment for use in mobile equipment. Standard, non-hazardous bentonite clay-water-based or polymer-water-based mud would be used for lubrication to cool the drill bit and to remove drill cuttings from the well. Wells would be cased and cemented in accordance with approved drilling permits to insure integrity of the wellbore and to isolate the wellbore from groundwater aquifers. Only non-hazardous additives would be used to prevent corrosion, adjust mud weight, or control lost circulation. Wells would be plugged and abandoned in accordance with BLM and NDOM regulations.

All of the proposed well pads would require vegetation clearing and grading to allow access and placement of the drill rig and associated equipment needed to drill the wells. Pads would be constructed from local compacted soil materials and surfaced with gravel.

Drilling would be conducted 24 hours per day, 7 days a week, and the drilling crew may consist of approximately 10 individuals dependent upon the type of drilling. Drilling crews would stay in nearby towns, during non-working hours so no lease camp facilities would be necessary.

Temperature Gradient Wells

Temperature gradient wells would be drilled to a maximum depth of 1,000 feet and would be approximately six inches in diameter. A rotary rig would typically be used to drill these wells. They would be drilled with a small truck-mounted drill rig. The drilling mast would range in height from 30 to 50 feet.

Temperature gradient wells would be finished by inserting a two-inch diameter black iron pipe with a cap fitted on the bottom into the well. The well would be allowed to equilibrate for a period of approximately 30 days after which a continuously recording thermistor would be lowered into the well to obtain a temperature profile. Repeat measurements of the temperature profile are likely to be made over the course of time.

Observation Wells

Observation wells would be drilled to a maximum depth of 4,000 feet and would be up to seven inches in diameter. They would be drilled with a small truck-mounted drill rig. The drilling mast would range in height from 30 to 50 feet.

The wells would be drilled either by reverse circulation using a combination of air and water or by a conventional mud rotary rig. Observation wells would be cased with a seven-inch casing to ten percent of the total depth of the well. A two-inch diameter black iron pipe or tubing, with a

cap fitted to the bottom would be placed inside of the casing. The pipe would be filled with water and a screw cap placed on top. The well would be allowed to equilibrate for a period of approximately 30 days after which the top cap would be removed and a continuously recording thermistor would be lowered into the well to obtain a temperature profile. Repeat measurements of the temperature profile are likely to be made over the course of time.

Production/Injection Wells

Production/injection type wells would be drilled with a standard rotary drill rig with ancillary equipment such as mud and water mixing tanks, above ground diesel generators, pipe racks, and trailers for on-site drilling supervisors and mud loggers. Equipment would be brought to the site by tractor-trailer trucks. The mast on the rig would range in height from 70 to 180 feet.

Production/injection wells would be drilled to depths ranging from 3,000 to 10,000 feet, beginning with a 30-inch diameter conductor pipe. Wellbores may be drilled vertical or directionally depending on the orientation of the target.

2.1.2 Flow Testing

Observation, production, and injection wells may be flow tested once drilling has been completed, and the geothermal resource or target permeability has been located. With the drill rig still in place over the wellbore, a short-term flow test lasting from two to four hours may be conducted. Fluids would be flowed to a sump. It may be necessary to stimulate flow by introducing liquid nitrogen through a coiled tubing apparatus, by applying increased pressure on the liquid column in the wellbore, or by other commonly used methods. Fluid temperatures, pressures, flow rates, and chemistry would be monitored during all flow tests. Discharge from flow tests would either go directly to the sump or to an existing injection well via a temporary pipeline laid along the access road. Necessary permits would be obtained from the Nevada Division of Environmental Protection for any reinjection of fluids.

Depending on the outcome of the short-term flow test, a long-term flow test of 5 to 21 days duration may be conducted. Long-term testing could be conducted by allowing the well to flow naturally or pumping depending upon the characteristics of the resource. Water from flow testing would be collected in the sump or pumped into an existing injection well as discussed above.

If wells are determined to be non-commercial, they may continue to be monitored for temperature and pressure to assist in understanding subsurface reservoir behavior or they may be abandoned. In the latter case, the wells would be treated in accordance with abandonment procedures of the BLM and the NDOM. Abandonment would involve plugging the wellbore

with sufficient cement, cutting off the casing at some specified depth below the surface, and welding a cap to the top of the casing string.

2.1.3 Water Use

As much as 5,000 to 8,000 gallons per well may be required during drilling of a temperature gradient well. As much as 10,000 to 15,000 gallons of water per day may be required during drilling of observation wells. As much as 20,000 to 30,000 gallons of water per day may be required during drilling of production and/or injection type wells. A smaller additional amount of water would be required on a daily basis for dust suppression during site preparation and operations. Water would be provided by an existing private well in the upper end of Edwards Creek Valley. A waiver from the State of Nevada for use in geothermal exploration will be reviewed in order to use the water from this private well for the geothermal exploration project. All water would be transported to the site by water truck.

2.1.4 Environmental Protection Measures/Best Management Practices

Environmental Protection Measures (EPMs) would reduce the impacts of the Proposed Action on the human and natural environment. The following EPMs would be implemented as part of the Proposed Action to reduce or eliminate impacts to the identified resources:

2.1.4.1 Air Quality

The following measures would be implemented by Magma to protect air quality:

- All applicable county, state, and federal air quality standards would be met through the use of the best available technology to control emissions.
- Water would be applied on roads when necessary to suppress dust.
- Prudent speed limits would be observed on unpaved roads throughout the project area in order to reduce dust emissions.
- Access roads, project area roads, and other traffic areas would be maintained on a regular basis to minimize dust and provide for safe travel conditions.

2.1.4.2 Cultural Resources

The following cultural resource protection measures would be implemented by Magma:

- Avoid known eligible and potentially eligible cultural resource sites through design, construction, and operation of the project.
- A 100-foot buffer zone would be established around eligible and potentially eligible cultural resource sites to help provide protection to the sites. The Proposed Action would not encroach into the established 100-foot buffer zone.

- The project facilities would be operated in a manner consistent with the engineered design to prevent problems associated with run-off that could affect adjacent cultural sites. This includes the use of acceptable erosion control methods that are applicable to the site conditions.
- Where the installation of project facilities could impact eligible or potentially eligible cultural sites(s), Magma would retain a qualified archaeologist to serve as a cultural monitor during construction of the facility in order to avoid potential effects to cultural site(s). The BLM would decide when cultural monitors are necessary.
- Limit vehicle and equipment travel to established roads and roads that are part of the Proposed Action.
- Any accidental discovery of cultural resources, items of cultural patrimony, sacred objects or funerary items would require that all activity in the vicinity of the find ceases, and Terri Knutson, Field Manager, Stillwater Field Office, 5665 Morgan Mill Road Carson City, Nevada 89701, be notified immediately by phone (775-885-6000) with written confirmation to follow. The location of the find would not be publicly disclosed, and any human remains must be secured and preserved in the place until a Notice to Proceed is issued by the authorized officer.

2.1.4.3 Wildlife

Magma would implement the following measures to minimize potential impacts to wildlife in the project area:

- Trash and other waste products would be properly managed and Magma would control garbage that could attract wildlife. All trash would be removed from the sites and disposed of at an authorized landfill.
- Speed limits would be posted, and, if necessary, speeds would be reduced, especially when wildlife is active near access and service roads.
- Vegetation clearing/blading would be avoided during the migratory bird nesting period. If vegetation removal is planned during this time, Magma would have planned removal areas surveyed for active nests prior to disturbance.
- Employees and contractors are strictly prohibited from carrying firearms on the job site to discourage illegal hunting and harassment of wildlife.
- Reclamation of the disturbed areas, as described earlier in this document, would be completed in order to return these areas to productive wildlife habitat.

2.1.4.4 Noxious Weeds, Invasive, and Non-Native Species

To minimize the introduction and establishment of noxious weeds, and invasive and non-native species in the disturbed areas, the following measures would be incorporated into the proposed project:

- A certified weed-free seed mix would be used during revegetation of disturbed areas.
- Concurrent reclamation would be used when feasible in order to minimize disturbed areas where weed species could establish.
- Magma would devise and implement a weed plan if noxious weeds were observed during reclamation monitoring.
- Growth medium and overburden stockpiles would be seeded with a weed-free seed mix as soon as possible following stockpile completion.
- Vehicle traffic would be restricted to defined roads (Figure 3) to reduce potential mechanical transport of noxious weed seeds.

2.1.4.5 Water Resources

EPMs that would be implemented for the protection of groundwater and surface water resources are as follows:

- Drilling activities would be kept to a minimum distance of 650 feet from any surface water body, riparian area, wetlands, playas, or 100-year floodplains.
- Drill pads would be graded to allow stormwater diversion from potential contaminants and to prevent ponding on the pad.
- Pads would be designed to avoid drainages and to minimize required cut and fill;
- Access across drainages, seeps, and springs would be avoided wherever possible. Culverts would be used if it is necessary to cross any large drainage.
- Silt fences and/or straw bales would be used in areas requiring sediment control.

2.1.4.6 Public Safety, Fire Protection, and Sanitation

EPMs that would be implemented for sanitation, fire protection, and public safety, are as follows:

- Portable sanitary facilities, serviced by a local contractor, would be located on-site for use by personnel during exploration activities.

- Noise suppression devices would be used on all compressors, and spark arresters would be used on all equipment that has the potential to emit sparks.
- Fire extinguishers would be visible and readily accessible on all drilling equipment used during exploration activities.

2.1.4.7 Reclamation

Magma would conduct concurrent reclamation to the extent practical. This would enhance revegetation success and reduce erosion and sedimentation from disturbed areas. A BLM-approved weed-free seed mix would be used to revegetate areas disturbed by exploration activities.

Reclamation activities would include ripping of pads and roads to loosen compacted soils and incorporate gravel into native material. Surfaces would be recontoured to blend with the surrounding topography. Growth medium from graded and excavated areas would be stockpiled on location for use in final reclamation. When no longer needed, all excavations would be backfilled and compacted areas ripped. Growth medium would be spread evenly over areas from which it was originally removed prior to seeding.

2.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, no exploration would occur and no geothermal resources would potentially be developed in the project area. Implementation of the No Action Alternative would not meet Magma's purpose and need for the project and would not meet national policy objectives to facilitate appropriate renewable energy development. Selection of the No Action Alternative may also impair geothermal lease development rights granted to Magma through the issuance of the federal geothermal leases.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the affected environment in the vicinity of the Proposed Action and the potential impacts from implementation of the Proposed Action.

3.1 SCOPING AND ISSUES

During the preliminary internal scoping in September 2009, BLM resource specialists identified the following resources as being present and potentially impacted by the Proposed Action:

- Cultural Resources;
- Migratory Birds;
- Native American Religious Concerns;
- Vegetation;
- Wild Horses and Burros;
- Wildlife; and
- BLM Sensitive Species.

The BLM consulted with the Fallon Paiute-Shoshone Tribe. Consultation letters were sent concerning the proposed project and the results of the cultural resource survey(s) on April 6, 2010 and January 11, 2011. Face-to-face consultation was conducted May 26, 2010, August 25, 2010, October 27, 2010, and May 25, 2011. Consultation will be ongoing until the completion of the current project.

3.2 PROPOSED ACTION

The project area lies at the north end of Edwards Creek Valley, west of Antelope Valley, between the Augusta Mountains and the New Pass Range in Churchill County, Nevada (Figures 1 and 2). The project area is in the Edwards Creek Valley Lease Area. It is situated 11 miles north of Highway 50 and 80 miles east of Fallon, Nevada. The elevation varies between 4,900 and 6,100 feet above mean sea level.

3.3 SUPPLEMENTAL AUTHORITIES

To comply with NEPA, the BLM is required to address specific resources of the environment that are subject to requirements in statutes, regulations or by executive order (BLM, 1988 and 2008). Table 5 identifies the resources that must be addressed in all environmental analyses, and denotes if the Proposed Action affects those resources. The determination of further analysis for each supplemental authority and other resources was made during internal scoping conducted by the BLM for the project.

Table 5 Supplemental Authorities

Supplemental Authority*	Not Present**	Present/Not Affected**	Present/May Be Affected***	Rationale and/or Section Found
Air Quality	X			
Areas of Critical Environmental Concern	X			
Cultural Resources			X	Carried through EA.
Environmental Justice	X			
Farm Lands (prime or unique)	X			
Forests and rangelands (HFRA Projects Only)	X			Not Applicable
Human Health and Safety (Herbicide Projects)	X			Not Applicable
Floodplains	X			
Invasive, Non-Native Species			X	Carried through EA.
Migratory Birds			X	Carried through EA.
Native American Religious Concerns			X	Carried through EA.
Threatened or Endangered Species	X			After consulting with the BLM wildlife biologist and the USFWS website for Nevada, there are no federally listed threatened or endangered species within the project area. See Appendix B. (http://ecos.fws.gov/tess_public/pub).
Wastes, Hazardous or Solid	X			
Water Quality (Surface/Ground)		X		There are no perennial surface water features in the project area.
Wetlands/Riparian Zones	X			
Wild and Scenic Rivers	X			
Wilderness	X			
Wildlands	X			****

*See H-1790 (January 2009) Appendix I Supplemental Authorities to be Considered

**Supplemental Authorities determined to be Not Present or Present/Not Affected need not be carried forward or discussed further in the document.

***Supplemental Authorities determined to be Present/May Be Affected must be carried forward in the document

****To comply with Secretarial Order No.3310 and the National Environmental Policy Act, the McCoy II proposed geothermal exploration project area was analyzed for the presence of wilderness characteristics. The proposed project area was found not to meet the requirements for Lands with Wilderness Characteristics per Manual 6300-1, Wilderness Inventory; Manual 6300-2, Consideration of Lands with Wilderness Characteristics in the Land use Planning Process; and the Wilderness Act of 1964.

This determination was based upon review of the files for the original and intensive wilderness inventories conducted in the late seventies and early eighties; the analysis of roadless areas, rights-of-ways; current and historic impacts from mining activities; and other disturbances such as fire suppression using GIS data and aerial photographs. A field visit was conducted on March 15 to provide additional ground truthing. The area was found to contain roads that have been improved and maintained by mechanical means and roads that receive regular and continuous use. The immediate project area exhibits signs of human activity and disturbance and does not contain areas that the imprint of man is substantially unnoticeable.

3.4 RESOURCE OR USES OTHER THAN SUPPLEMENTAL AUTHORITIES

Other resources of the human environment that have been considered for this EA are listed in Table 6. Elements that are present and may be affected are further described and analyzed in the EA. Rationale for those elements that would not be affected by the Proposed Action and alternative are provided in Table 6.

Table 6 Resources or Uses Other than Supplemental Authorities

Resource or Issue	Not Present*	Present/Not Affected*	Present/May Be Affected**	Rationale and/or Section Found
Land Use Authorization			X	Carried through EA.
Minerals			X	Carried through EA.
Soils			X	Carried through EA.
Vegetation			X	Carried through EA.
Wild Horses and Burros			X	Carried through EA.
Wildlife			X	Carried through EA.
BLM Sensitive Species (Plant and Animal)			X	Carried through EA.

*Resources or Issues determined to be Not Present or Present/Not Affected need not be carried forward or discussed further in the document.

**Resources or Issues determined to be Present/May Be Affected must be carried forward in the document.

3.5 RESOURCES OR USES PRESENT AND BROUGHT FORWARD FOR ANALYSIS

This section includes a description of the affected environment for the Proposed Action and the potential impacts from implementation of the Proposed Action. Magma has incorporated EPMs into the Proposed Action to reduce or eliminate potential impacts to the environment. Proposed EPMs and planned reclamation activities are presented in Sections 2.1.4. The development of potential impacts to the resources takes into account the implementation of EPMs.

The Proposed Action consists of up to 69.02 acres of proposed disturbance as shown in Table 4. The project includes geothermal leases within the McCoy II Unit Area (NVN-88129X). JBR Environmental Consultants, Inc. conducted vegetation and wildlife surveys of the project area on July 30 and 31, 2009 and September 22 and 23, 2010.

3.5.1 Cultural Resources

Affected Environment

Natural Setting

The project area is located along the western slopes of the Augusta Mountains in the north, along the western and northeastern slopes of the New Pass Range in the south, and is northeast of Edwards Creek Valley, west of Antelope Valley, and east of the Clan Alpine Mountains. The area is dissected by numerous intermittent drainages and moderate to steep slopes in some areas.

Along the west and east sides of the Augusta Mountains are fault scarps, generally overlapped by Quaternary deposits. Faulted alluvium is also commonplace in this area and movement on the bounding faults is locally Holocene. The alluvial fans in Edwards Creek Valley bear indistinct terraces carved by the lakes of Lake Lahontan that occupied this valley (Willden and Speed 1974:29, 44).

No springs were noted in the project area. Elevation in the project area ranges between 5,200 to 5,840 feet above mean sea level. Primary vegetation noted includes juniper, pinyon, tall sage, cheatgrass, Indian ricegrass, rabbitbrush, and witch hazel.

Previous Cultural Resource Investigations

The Class I literature review for previous inventories carried out by Applied Earthworks have been deemed suitable for the current project area. Six cultural resource inventories have previously been conducted within the project area.

Inventory Methods

Pedestrian survey of 124.1 acres was carried out by Native-X Principal Investigator John W. Jones, Neal MacClyment, and Lee Duryee between June 21-25, 2010, and submitted a reviewed and edited report, entitled *A Cultural Resource Inventory of 19 Proposed Drill Pad Locations and Access Roads for Magma Energy's Geothermal Exploration Project, Churchill County, NV* (BLM Report: CRR 3-2449). The inventory covered 19 drill pads and seven miles of access roads. Each drill pad was surveyed to cover a 300-foot by 300-foot area, and each access road segment was surveyed to cover a 100-foot-wide swath. An additional survey was conducted by Native-X in April 2011 and included approximately 10 miles of roads within the McCoy II project area. The survey was conducted by Neal MacClyment and Jerry Harden.

Careful attention was paid to all areas of deflation, drainages, rodent burrows and backdirt, ridge tops, cut banks, and road disturbance noticed within the project area.

Ground visibility was good to excellent. When cultural resources were located, a close inspection of the immediate area was conducted. Cultural material found was mapped and the

site plotted on a 7.5' USGS quadrangle map. Site datum and boundaries were established using a Trimble GPS unit with three-meter accuracy. The documentation process also included IMACS site recordation and photographs. No artifacts were collected.

Inventory Results

During the cultural resources inventories conducted by Native-X, 20 sites and 16 isolates were recorded and evaluated for the National Register of Historic Places (NRHP). These include eight lithic scatters CrNV-03-7795, -7799, -7801, -7804, -8128, -8130, -8133, and -8135 ; eight historic sites CrNV-03-7796, -7798, -7800, -7802, -7805, -8129, -8132, and -8134; and four multi-component sites CrNV-03-7797, -7803, -7806, and -8131.

Of the eight lithic scatters recorded, three are recommended eligible for the NRHP under criterion (D). Site CrNV-03-7799 contains three separate lithic concentrations with some flakes partially buried suggesting subsurface deposits. Site CrNV-03-7804 consists of three lithic concentrations with Humboldt and Elko series projectile points and partially buried flakes. CrNV-03-8128 shows signs of buried deposits and contains groundstone. Because these sites appear to have subsurface deposits, they are recommended eligible for the NRHP under criterion (D). None of the other sites are recommended eligible for the NRHP.

It is recommended that sites CrNV-03-7799, and -7804, be avoided during exploration and drilling activities in the project area. Road improvements on the road to Pad E would impact CrNV-8128.

No ethnographic information could be found dealing specifically with the project area. The closest area is Edwards Creek Valley as reported by Steward (1938). Steward noted two Paiute villages in Edwards Creek Valley named as *Wanahunupi* on a creek on the eastern side of the valley, and *Acamudzi* near a little mountain southeast of Alpine (Steward 1938:103). No further information was given.

Environmental Consequences

Three NRHP-eligible cultural sites overlap with certain proposed project components. Project construction could affect the cultural site's NRHP eligibility, which would be considered a significant impact. The locations of the historic properties would be provided to the proponent and flagged for avoidance. Most of the proposed activities associated with the McCoy Project should not impact any identified cultural resources, as the project components are all located away from eligible sites and historic properties. Impacts to known cultural sites would occur with improvements to the road to Pad E.

It is important that vehicles and traffic stay within the clearly delineated and flagged APE during all operations associated with the proposed projects, because undiscovered resources likely exist outside this area. Culturally “cleared” areas would be clearly flagged and staff would be informed to stay within the “cleared” area. Staff would also be informed that any effects on, defacement of, or removal and/or disturbance of archaeological, historical, or sacred material is prohibited and subject to disciplinary action.

The Natural Historic Preservation Act of 1966 (NHPA), as amended, and the Archaeological Resources Protection Act of 1979 (ARPA) are the primary laws regulating preservation of cultural resources. Federal regulations obligate federal agencies to protect and manage cultural resource properties and prohibit the destruction of significant cultural sites and historic properties without first mitigating the adverse effect to the site.

The NHPA sets forth procedures for considering effects to historic properties and supports and encourages the preservation of prehistoric and historic resources. It directs federal agencies to consider the impacts of their actions on historic properties. Section 106 of the NHPA, as amended, requires federal agencies to take into account any action that may adversely affect “any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register.” Regulations, codified in 36 CFR 800, provide criteria to determine if a site is eligible. Beyond that, the regulations define how those properties or sites are to be dealt with by federal agencies or other involved parties. These regulations apply to all federal undertakings and all cultural (archaeological, cultural, and historic) resources.

The ARPA sets a broad policy that archaeological resources are important to the nation, as well as locally and regionally, and should be protected. The purpose of the ARPA is to secure the protection of archaeological resources and sites that are on public lands and Native American lands. The law applies to any agency that receives information that a federally assisted activity could cause irreparable harm to prehistoric, historic, or archaeological data and provides criminal penalties for prohibited activities.

3.5.2 Invasive, Non-Native Species

Affected Environment

The BLM defines a noxious weed as, “a plant that interferes with management objectives for a given area of land at a given point in time”. The BLM Carson City District recognizes the current noxious weed list designated by the State of Nevada Department of Agriculture statute (NDA, 2009). An invasive species is defined as a non-native or alien plant or animal that has entered into an ecosystem. Invasive species are likely to cause economic harm or harm to human health (Executive Order 13112). Noxious weeds, invasive and non-native species are highly competitive, aggressive and easily spread.

Burned portions of the project area are dominated by the annual invasive species cheatgrass (*Bromus tectorum*), Russian thistle (*Salsola* sp.), and halogeton (*Halogeton glomeratus*).

Environmental Consequences

The proposed disturbance has the potential to create conditions favorable for invasive, non-native, and noxious species. Proposed disturbance would directly impact approximately 69.02 acres leaving these disturbed areas susceptible to invasive, non-native, and noxious species. In addition, transport of weed species to other proposed exploration sites could occur. With the implementation of the EPMs discussed in Section 2.1.4.4 and successful reclamation, impacts from invasive, non-native, and noxious weeds is expected to be minimal.

3.5.3 Migratory Birds

Affected Environment

On January 11, 2001, President Clinton signed Executive Order 13186 (EO) placing emphasis on the conservation and management of migratory birds. Migratory birds are protected under the Migratory Bird Treaty Act of 1918 (MBTA) and the EO addresses the responsibilities of federal agencies to protect migratory birds by taking actions to implement the MBTA. BLM management for migratory bird species on BLM- administered lands is based on Instruction Memorandum (IM) No. 2008-050 (BLM, 2007b). Based on this IM, migratory bird species of conservation concern include ‘Species of Conservation Concern’ and ‘Game Birds Below Desired Conditions’. These lists were updated in 2008 (USFWS, 2008).

The Nevada Department of Wildlife’s (NDOW’s) Wildlife Action Plan characterized Nevada’s vegetative land cover into eight broad ecological system groups and linked those with key habitat types, which are further refined into ecological systems characterized by plant communities or associations that support various wildlife species (Wildlife Action Plan Team, 2006). The key habitats associated with this project include Intermountain Cold Desert Scrub (mixed salt desert scrub), Sagebrush (mixed sagebrush shrubland), and Lower Montane Woodlands (pinyon-juniper woodland). Wildland fires burned approximately 68 percent of the project area in 1999 (BLM, 2009). As a result of the fires, cold desert scrub and in particular, sagebrush habitat, are very fragmented due to loss of shrubs and large areas of cheatgrass. Key habitats in unburned portions of the project area support moderate nesting densities and abundance.

Migratory bird species that would likely utilize these habitat types include the horned lark (*Eremophila alpestris*), black-throated sparrow (*Amphispiza bilineata*), sage sparrow (*Amphispiza belli*), loggerhead shrike (*Lanius ludovicianus*), Cassin’s finch (*Carpodacus cassinii*), western scrub-jay (*Aphelocoma californica*), Stellar’s jay (*Cyanocitta stelleri*), juniper titmouse (*Baeolophus ridgwayi*), gray flycatcher (*Empidonax wrightii*), Clark’s nutcracker (*Nucifraga columbiana*), Black-throated gray warbler (*Dendroica nigrescens*), Brewer’s sparrow

(*Spizella breweri*), sage thrasher (*Oreoscoptes montanus*), mountain bluebird (*Sialia currucoides*), and the vesper sparrow (*Pooecetes gramineus*). Bird species observed in the project area in July 2009 include the horned lark, American crow (*Corvus brachyrhynchos*), and red-tailed hawk (*Buteo jamaicensis*).

Golden Eagle

The Bald and Golden Eagle Protection Act (1940 as amended 1959, 1962, 1972, and 1978) prohibits the take or possession of bald and golden eagles with limited exceptions. Take, as defined in the Eagle Act, includes “to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” Disturb means “to agitate or bother a bald or golden eagle to a degree that causes or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding or sheltering behavior.”

Important eagle-use area is defined in the Eagle Act as an eagle nest, foraging area, or communal roost site that eagles rely on for breeding, sheltering, or feeding, and the landscape features surrounding such nest, foraging area, or roost site that are essential for the continued viability of the site for breeding, feeding, or sheltering eagles.

BLM requires consideration and National Environmental Policy Act analysis of golden eagles and their habitat for all renewable energy projects (BLM, 2010).

Surveys were conducted for golden eagle nests in the project area and within a mile of the project boundary. Surveys were conducted in July 2009 and September 2010. No golden eagle nests were observed in the project area or within a one-mile radius of the project area. Two golden eagles were observed soaring approximately a quarter mile outside of the project area during the September 2010 survey.

Environmental Consequences

Construction of drill pads, new roads, parking areas, and surface disturbance from improving roads could result in a maximum of 69.02 acres of direct habitat loss. Heavy equipment associated with roads and drilling could also result in direct mortality from bird strikes. Indirect temporary effects from noise, human presence, and heavy equipment present during construction activities may lead to reduced nesting success for individuals that are not displaced but are affected by the fragmentation and/or overall footprint of the project (10,735 acres), or to individuals displaced into surrounding areas. This in turn may affect foraging opportunities for species that prey on adults, nestlings, or eggs. Raptor species, such as prairie falcon, that prey on rodents and lizards may also be affected by these activities.

Disturbance from the project may affect bird species differently. For example, birds with higher-frequency calls seem to be less likely to avoid roadways than birds with lower-frequency calls (Barber et al. 2009, and references therein).

However, because of the minimal extent and temporary nature of effects from drilling activities and the small habitat acreage loss relative to the hundreds of thousands of acres of available cold desert scrub, sagebrush, and lower montane woodlands habitats that are available in proximity to the Proposed Action area, population viability for any one species is not expected to be in jeopardy as a result of the components of the Proposed Action. Pre-construction migratory bird nest surveys and other EPMs (Section 2.1.4.3) are expected to minimize and/or eliminate potential impacts to individual birds. Additionally, because no known golden eagle nests are within two miles of the project area, there are hundreds of thousands of acres of available habitat for foraging in the area, and negligible prey impacts are expected, no “Take” or disturbance to “Important Eagle Use Areas” is reasonably expected.

3.5.4 Native American Religious Concerns

Affected Environment

Native American resources are sites, areas and materials important to Native Americans for religious, spiritual or traditional reasons. These resources include villages, burials, petroglyphs, rock features, or spring locations. Fundamental to Native American religions is the belief in the sacred character of physical places, such as mountain peaks, springs, or burials. Traditional rituals often prescribe the use of particular native plants, animals or minerals. Activities that may affect sacred areas, their accessibility or the availability of materials or natural resources used in traditional practices are also considered when evaluating these areas.

Ethnographic information indicates that the Northern Paiute and Western Shoshone occupied the study area, and their way of life is characterized by the concept of living in harmony with the natural environment. Rituals and ceremonies address the need to ensure that plants, animals and physical elements flourish. The continued welfare of the people depends on these rituals and ceremonies being performed properly. The manner of performing the rituals and ceremonies, the places at which they are performed and perhaps even the time of their performance are often prescribed.

Environmental Consequences

Concerns and comments included adverse effects to water resources (both hot and cold), recommendation of avoidance of all cultural resources. Magma has agreed to avoid all historic and prehistoric eligible sites. Consultation would be ongoing with the tribe(s) until completion of the projects.

3.5.5 Land Use Authorization

Affected Environment

The project area is located in Churchill County and consists of 10,735 acres of public lands administered by the BLM. The project area can be accessed by traveling east from Fallon, Nevada approximately 80 miles on Highway 50 then turning north on an unnamed gravel road. The project area is located approximately 11 miles north of Highway 50.

Major land uses in the area include livestock grazing, wildlife habitat, and dispersed recreation such as off-highway vehicle (OHV) use, hunting, and camping. The project area is located within Hole in the Wall and Clan Alpine grazing allotments. Magma owns the geothermal and mining claims located within the project boundary. There are no rights-of-way located within the project boundary. There is potential for pine nut harvest in the pinyon-juniper woodland community which is found in a small portion of the project area in mostly unburned islands on higher-elevation hillsides.

The Augusta Mountains Wilderness Study area is located approximately a half a mile north of the project area, and the Clan Alpine Mountains Wilderness Study Area is located approximately six miles west of the project area. Wilderness Study areas restrict mining and energy development.

Environmental Consequences

The Proposed Action would not interfere with current land uses or prevent existing access to public lands. The Proposed Action would not eliminate any pinyon-juniper habitat and thus would not adversely affect pine nut harvest. After successful reclamation of the 69.02 acres of disturbance, the area would remain available for other uses; therefore, impacts would be minimal.

3.5.6 Minerals

Affected Environment

The project area is within the Wild Horse Mining District. Minerals were discovered in the district in 1916. Minerals found within the Wild Horse Mining District include mercury, manganese, and antimony (Tingley, 1998).

Environmental Consequences

There would be no removal of material from the site. Impacts to geology and minerals in the project area would be minimal. The area surrounding the Proposed Action would remain open and available for mineral exploration and development.

3.5.7 Soils

Affected Environment

Mapping units designated from the Natural Resources Conservation Service soils surveys of Churchill County was used to describe the soils. The project falls within 16 different soil associations. The majority of the project area is in soil mapping unit 300, “Old Camp-Colbar-Rock outcrop association” (Figure 5).

In general, the geomorphic position that soils form within the project area are mountains. The dominant parent material of soils within the project area is volcanic ash and rock. The project area consists of shallow to moderately deep soils that are well drained (NRCS, 2010).

Environmental Consequences

Disturbance to a maximum of 69.02 acres of surface soils would result from the implementation of the Proposed Action. The majority of the area is in soil mapping unit 300, “Old Camp-Colbar-Rock outcrop association, steep,” which Natural Resources Conservation Service describes as having a 30-50 percent slope and a K factor of 0.17, which indicates low to moderate erosion susceptibility (NRCS, 2010). In general, with removal of vegetation and surface soil disturbance, soils would experience increased wind and water erosion. Soils would be compacted by heavy equipment and gravel placement, and soil microbial activity and soil productivity would decrease in areas of soil disturbance. In locations where gravel has been placed on roads or pads, material would be missed with the soil during reclamation changing the texture and structure of the soils.

The soil disturbance would be dispersed spatially as drill sites and roads are developed during exploration. Existing drill sites and roads would be used whenever possible to avoid additional disturbance. With the implementation of EPMs as discussed in Section 2.1.4 and successful reclamation, impacts from the Proposed Action to soils resources would be minimal.

3.5.8 Vegetation

Affected Environment

The vegetation community types within the project area include mixed sagebrush shrubland, mixed salt desert scrub, and pinyon-juniper woodland. The location of an individual vegetation community depends on several factors including elevation, soil type and depth, slope, aspect, and precipitation. In 1999, two wildland fires, the New Pass Fire and the Antelope Fire, burned approximately 8,324 acres (68 percent of the project area). Burned portions of the project area are dominated by the annual invasive species cheatgrass, Russian thistle, and halogeton. Portions of the burn area may have been seeded with crested wheatgrass (*Agropyron cristatum*), basin wildrye (*Leymus cinereus*), western wheatgrass (*Pascopyrum smithii*), and globemallow (*Sphaeralcea ambigua*). The project area lacks perennial surface water and/or features. The

vegetation communities present in the project area are shown in Figure 6 and are discussed below.

Mixed Sagebrush Shrubland Community

The mixed sagebrush shrubland is the dominant community type in the project area and intermixes with the other community types. Plant species observed in this community include big sagebrush (*Artemisia tridentata* sp.), rubber rabbitbrush (*Ericameria nauseosa*), broom snakeweed (*Gutierrezia sarothrae*), green ephedra (*Ephedra viridis*), winterfat (*Krascheninnikovia* sp.), Sandberg bluegrass (*Poa secunda*), bottlebrush squirreltail (*Elymus elymoides*), and cheatgrass.

Mixed Salt Desert Scrub Community

The salt desert scrub vegetation community is found in a small portion of the project area. Plant species observed in this community include greasewood (*Sarcobatus* sp.), spiny hopsage (*Grayia spinosa*), broom snakeweed, winterfat, and bud sagebrush (*Picrothamnus* sp.). The salt desert scrub community in the project area contains sparse understory vegetation comprised mainly of scattered Indian ricegrass (*Achnatherum hymenoides*) and Sandberg bluegrass as well as annual invasive species cheatgrass, halogeton, and Russian thistle.

Pinyon-Juniper Woodland Community

The pinyon-juniper woodland community is found in a small portion of the project area in mostly unburned islands on higher-elevation hillsides. Utah juniper (*Juniperus osteosperma*) was more common than singleleaf pinyon (*Pinus monophylla*). Understory vegetation in this community type is sparse and is comprised of mostly big sagebrush, green ephedra, Sandberg bluegrass, and annual invasive species cheatgrass and Russian thistle.

Environmental Consequences

Direct impacts to vegetation may include the removal of a maximum of 69.02 acres of mixed sagebrush shrubland and mixed salt desert scrub vegetation communities. Additional impacts to vegetation would be the potential for introduction and spreading of non-native species on the 69.02 acres of disturbed ground with the abundance of these non-native species in surrounding areas, it is likely these species will invade the disturbed areas. With the implementation of the EPMs discussed in Section 2.1.4 and successful reclamation, impacts to vegetation would be minimal.

3.5.9 Wild Horses and Burros

Affected Environment

The BLM manages wild horses and burros under the authority of the Wild Free-Roaming Horses and Burros Act of 1971. Wild horses and burros are managed in subsets of herd areas, or herd

management areas (HMAs). The project area contains portions of the Augusta Mountains HMA, the Clan Alpine HMA, and the New Pass-Ravenswood HMA, which are shown in Figure 7. Wild horses move freely across public lands, and the project area is used by wild horses. The appropriate population management levels are 155 horses for the Augusta Mountains HMA, 619 to 979 horses for the Clan Alpine HMA, and 69 to 90 horses for the New Pass-Ravenswood HMA (BLM, 2001).

Environmental Consequences

Under the Proposed Action, approximately 69.02 acres of forage may be temporarily removed. Pinyon-juniper woodlands are important habitat components for wild horses as they use the pinyon and juniper for shelter and escape cover. The Proposed Action would not eliminate any pinyon-juniper habitat and thus would not adversely affect cover habitat for the existing wild horse populations.

Increased activity within the project area could lead to increased avoidance by resident wild horses in areas of activity. Wild horses are expected to avoid disturbed areas due to increased human activity and the operation of drilling equipment. Indirect impacts relating to competition for resources from displaced individuals moving to adjacent habitat would occur as long as exploration activities are occurring.

3.5.10 Wildlife

Affected Environment

NDOW's Wildlife Action Plan classified Nevada's vegetative land cover into eight broad ecological system groups and linked those with key habitat types, which are further refined into ecological systems characterized by plant communities or associations that support various wildlife species (Wildlife Action Plan Team, 2006). The key habitats associated with this project include Intermountain Cold Desert Scrub (mixed salt desert scrub), Sagebrush (mixed sagebrush shrubland), and Lower Montane Woodlands (pinyon-juniper woodland) (see Section 3.5.4). Wildland fires burned approximately 68 percent of the project area in 1999 (BLM, 2009). The project area lacks perennial surface water and/or features.

Wildlife species typically found dependant on habitats in the project area include the kit fox (*Vulpes macrotis*), pale kangaroo mouse (*Microdipodops pallidus*), pygmy rabbit (*Brachylagus idahoensis*), Great Basin pocket mouse (*Perognathus parvus*), sagebrush vole (*Lemmiscus curtatus*), sagebrush lizard (*Sceloporus graciosus*), greater sage-grouse (*Centrocercus urophasianus*), ferruginous hawk (*Buteo regalis*), and Horned lark (*Eremophila alpestris*).

Wildlife or wildlife sign (burrows, scat, tracks) observed during the July 2009 and September 2010 survey include coyote (*Canis latrans*), pronghorn antelope (*Antilocapra americana*),

mountain cottontail (*Sylvilagus nuttallii*), black-tailed jackrabbit (*Lepus californicus*), Golden eagle (*Aquila chrysaetos*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), western fence lizard (*Sceloporus occidentalis*), and longnose leopard lizard (*Gambelia wislizenii*) which are typical of these habitats.

Portions of the project area are considered all-year mule deer (*Odocoileus hemionus*) and pronghorn antelope habitat, and desert big horn sheep (*Ovis canadensis nelsoni*) habitat is present in surrounding, higher-elevation mountain ranges (NDOW, 2010). The project area is also considered potential habitat for elk (*Cervus elaphus*) (BLM, 2009a). The project area is within the NDOW hunting Area 18, Hunt Unit 183.

Environmental Consequences

Construction of drill pads, new roads, parking areas, and surface disturbance from improving roads could result in a maximum of 69.02 acres of direct habitat loss and potential mortality for lizards and small mammals that forage and/or have burrow complexes within these habitats. Indirect temporary effects from noise, human presence, and heavy equipment present during construction activities may lead to reduced breeding success for individuals that aren't displaced but are affected by the fragmentation of the overall footprint of the project (12,058 acres), or to individuals displaced into surrounding areas. This in turn may affect distribution of larger mammals and raptors that forage on rodents and small mammals. Direct and indirect effects from temporary noise associated with drilling operations affect species differently. For example, bats (i.e. pallid bat) that find their prey from noise that the prey makes instead of echolocation have been shown to avoid noisy areas. Bats using echolocation were unaffected because those ultrasonic signals are above the spectrum of human noise. Rodents that use chirps to warn of predators may be susceptible to increased predation because these chirps may be masked from the drilling noise (Barber et al., 2009). Big game species may avoid the area when traveling between mountain ranges.

However, because of the minimal extent and temporary nature of effects from drilling activities and the small habitat acreage loss relative to the hundreds of thousands of acres of available cold desert scrub, sagebrush, and lower montane woodlands habitats that are available in proximity to the Proposed Action area, population viability for any one species is not expected to be in jeopardy as a result of the components of the Proposed Action. EPMs (see Section 2.1.4.3) are expected to minimize and/or eliminate potential impacts to individuals. Additionally, big game species would not reasonably incur additional physiological stress leading to decreased survival by avoiding the project area when crossing between mountain ranges.

3.5.11 BLM Sensitive Species

Affected Environment

Sensitive species are defined in BLM Manual 6840 (Special Status Species Management) as native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management and either one of the following:

1. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or
2. The species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk.

The key habitats associated with the project area include Intermountain Cold Desert Scrub (mixed salt desert scrub), Sagebrush (mixed sagebrush shrubland), and Lower Montane Woodlands (pinyon-juniper woodland). Wildland fires burned approximately 68 percent of the project area in 1999 (BLM, 2009). The project area lacks perennial surface water and/or features.

The sensitive species that may occur within the project area were identified through consultation with the Nevada Natural Heritage Program and species lists for Churchill County (NNHP, 2009). The Nevada BLM Sensitive Species list (BLM, 2003) was also reviewed. BLM sensitive plant and animal species with potential habitat and potential to occur in the project area are presented in Table 7. No BLM sensitive species were observed during surveys conducted in 2009 and two soaring golden eagles were identified in the survey conducted in 2010.

Table 7 BLM Sensitive Species with Potential to Occur in the Project Area

Common Name	Scientific Name	Listed as per IM 2008-050	BLM Sensitive Species
Birds			
Northern goshawk	<i>Accipiter gentilis</i>	Yes	Yes
Golden eagle	<i>Aquila chrysaetos</i>	Yes	Yes
Burrowing owl	<i>Athene cunicularia</i>	Yes	Yes
Juniper titmouse	<i>Baeolophus griseus</i>	No	Yes
Ferruginous hawk	<i>Buteo regalis</i>	Yes	Yes
Greater sage-grouse	<i>Centrocercus urophasianus</i>	Yes	Yes
Prairie falcon	<i>Falco mexicanus</i>	Yes	Yes
Pinyon jay	<i>Gymnorhinus cyanocephalus</i>	Yes	Yes
Loggerhead shrike	<i>Lanius ludovicianus</i>	Yes	Yes

Common Name	Scientific Name	Listed as per IM 2008-050	BLM Sensitive Species
Vesper sparrow	<i>Pooecetes gramineus</i>	Yes	Yes
Mammals			
Pallid bat	<i>Antrozous pallidus</i>	N/A	Yes
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	N/A	Yes
Big brown bat	<i>Eptesicus fuscus</i>	N/A	Yes
Spotted bat	<i>Euderma maculatum</i>	N/A	Yes
Hoary bat	<i>Lasiurus cinereus</i>	N/A	Yes
California myotis	<i>Myotis californicus</i>	N/A	Yes
Small-footed myotis	<i>Myotis ciliolabrum</i>	N/A	Yes
Long-eared myotis	<i>Myotis evotis</i>	N/A	Yes
Little brown myotis	<i>Myotis lucifugus</i>	N/A	Yes
Fringed myotis	<i>Myotis thysanodes</i>	N/A	Yes
Long-legged myotis	<i>Myotis volans</i>	N/A	Yes
Western pipistrelle bat	<i>Pipistrellus hesperus</i>	N/A	Yes
Pygmy rabbit	<i>Brachylagus idahoensis</i>	N/A	Yes
Desert bighorn sheep	<i>Ovis canadensis nelsoni</i>	N/A	Yes
Reptiles			
Short-horned lizard	<i>Phrynosoma douglassii</i>	N/A	No
Plants			
Elko rockcress	<i>Arabis (Boechea) falcifructa</i>	N/A	Yes
Ophir rockcress	<i>Arabis ophira</i>	N/A	No
Eastwood milkweed	<i>Asclepias eastwoodiana</i>	N/A	Yes
Windloving buckwheat	<i>Eriogonum anemophilum</i>	N/A	Yes
Lahontan Basin buckwheat	<i>Eriogonum rubricaula</i>	N/A	No
Lahontan beardtongue	<i>Penstemon palmeri</i> var. <i>macranthus</i>	N/A	Yes
Tiehm's beardtongue	<i>Penstemon tiehmii</i>	N/A	Yes
Reese River phacelia	<i>Phacelia glaberrima</i>	N/A	No

The project area is within the Desatoya and Clan Alpine Sage-grouse Population Management Units and NDOW has delineated the area as late summer and winter range (NDOW, 2010a). However, the recent fires in the area have fragmented and degraded the habitat into unsuitable habitat for sage-grouse needs. The nearest documented pygmy rabbit locations are 20 miles north of the project area in the Fish Creek Mountains (NDOW, 2010).

Environmental Consequences

Environmental consequences are expected to be the same for BLM designated Sensitive Species as is described for the migratory birds and wildlife sections. Indirect impacts to BLM sensitive plants species may occur through the potential for introducing or facilitating the further spread of invasive non-native plants. Because of the minimal extent and temporary nature of effects from drilling activities and the small habitat acreage loss relative to the hundreds of thousands of acres

of available cold desert scrub, sagebrush, and lower montane woodlands habitats that are available in proximity to the Proposed Action area, and the fragmented and degraded habitat due to fires, population viability for any one species is not expected to be in jeopardy as a result of the components of the Proposed Action. EPMs (Sections 2.1.4.3 & 2.1.4.4) are expected to minimize and/or eliminate potential impacts to individual plants or animals.

Additional impacts would include the potential for introduction and spreading of invasive non-native weed species on the 69.02 acres of disturbed ground and displacement of native species. These impacts would occur as long as exploration activities are occurring. Potential impacts to golden eagles are discussed in Section 3.5.2.

3.5.12 Lease Restrictions

Affected Environment

Lease NVN-86905 stipulates no surface occupancy where slopes are “in excess of 40 percent and/or soils (have) high erosion potential.” The only drill pad located on lease NVN-86905 is pad X. This pad is located in an area with a slope of approximately 8 to 26 percent. The area is in soil mapping unit 300, “Old Camp-Colbar-Rock outcrop association, steep,” which Natural Resources Conservation Service describes as having a 30-50 percent slope and a K factor of 0.17, which indicates low to moderate erosion susceptibility (NRCS, 2010).

Lease NVN-85725 has timing limitation stipulations for sage-grouse strutting and nesting areas. This stipulation states “Surface use is prohibited from March 1-August 1 within 2.0 miles (line of site) of sage-grouse strutting or nesting areas.” The Proposed Action encompasses the Clan Alpine and Desatoya sage-grouse population management units. However, the Proposed Action area has suffered multiple fires since 1999, which has destroyed most of the sagebrush habitat that existed. Most of the area is now dominated by invasive annual grasses or the shrub areas that are left are patchy and cannot support sage-grouse populations. NDOW and BLM have been consulted on the habitat available in the area described for this stipulation. There are no known leks within this area.

Environmental Consequences

The lease stipulations in regards to slope do not apply to Pad X, as this pad is located in an area with less than 40 percent slope.

The Best Management Practices, stipulations, and mitigation related to sage-grouse that is outlined in lease NVN-85725 are no longer applicable because of the degraded habitat found in the area.

3.6 NO ACTION ALTERNATIVE

Affected Environment

The affected environment described for the Proposed Action would be the same for the No Action Alternative.

Environmental Consequences

The environmental consequences described above under each resource would not occur under the No Action Alternative.

4.0 CUMULATIVE IMPACTS

This section analyzes the potential cumulative impacts to the resources from past, present, and reasonably foreseeable future projects combined with the Proposed Action within the project area. A cumulative impact has been defined as the impact which results from the incremental impact of the action, decision, or project when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

The cumulative study area is defined by the McCoy II Unit Lease Area, and encompasses approximately 12,058 acres as shown in Figure 1. The entire project area is located on public lands managed by the BLM in the Edwards Creek Valley Lease Area. The following sections contain descriptions of activities that have occurred and may occur in the reasonably foreseeable future within the project area, and an analysis of the impacts of these activities within a regional context.

The primary activities from the past, present, and reasonably foreseeable future that would contribute to cumulative impacts from adding the impacts from the Proposed Action include: existing dirt and gravel roads, existing mining disturbance, exploration and development of geothermal resources, grazing, dispersed recreation, and wildland fire. These projects are described further below and are provided in Table 8.

- Existing Dirt and Gravel Roads – There are approximately 16.2 miles of existing dirt and gravel roads within the project area. Assuming the roads are 15 feet wide, existing roads within the project area account for 30 acres of disturbance on public lands. These roads are devoid of vegetation and do not provide productive soils and habitat for plant and wildlife species.
- Existing Mining Disturbance – There is approximately 30 acres of existing unreclaimed mining and mineral exploration disturbance within the project area. These areas contain sparse native and invasive non-native vegetation.
- Geothermal Leases – Past, present, and reasonably foreseeable future activities on the geothermal leases within the project area may include geophysical and drilling exploration, and geothermal production, in addition to the Proposed Action. Energy production from the geothermal resource would include ancillary facilities, such as transmission lines, and water for operations. Disturbance associated with the Proposed Action accounts for 69.02 acres of disturbance with an estimated 30 acres of disturbance for potential future activities.

- Grazing – Past, present, and future livestock grazing occurs within the project area. Three grazing permits are managed by the BLM within the project area. There is approximately three acres of existing disturbance associated with domestic cattle (watering/gathering areas) within the project area.
- Dispersed Recreation – Past, present, and reasonably foreseeable future dispersed recreation takes place within the project area. Recreation activities consist of hunting, OHV use, and casual recreation.
- Wildland Fire – Past, present, and future wildland fires occur both naturally and through human activities in the project area. In 1999 alone, approximately 68 percent of the study burned. A total of 8,324 acres within the study area have burned.

Within the study area, there is approximately 60 acres of existing disturbance not including wildland fires. Including the disturbance associated with the Proposed Action and other reasonably foreseeable future activities within the geothermal lease area, there would be approximately 141.1 acres of disturbance or 1.2 percent of the project area.

The following sections discuss the cumulative effects of the Proposed Action when combined with past, present, and reasonably foreseeable future projects within the project area as described above. Impacts to the following resources are analyzed in the cumulative effects sections below:

- Cultural Resources;
- Migratory Birds;
- Native American Religious Concerns;
- Vegetation;
- Wild Horses and Burros;
- Wildlife; and
- BLM Sensitive Species.

4.1 CULTURAL RESOURCES

Impacts to the integrity of setting of any subsequently identified National Register listed/eligible sites where integrity of setting is critical to their listing/eligibility could occur from the establishment of mineral exploration and geothermal development activities. Construction activities could increase the likelihood of vandalism and illegal collecting/excavation of cultural sites. These impacts to cultural resources could be prevented through the Section 106 process of the NHPA. Mitigation measure(s) requiring surveys for cultural resources prior to surface disturbing activities, as required by the Proposed Action, would reduce the potential impacts to cultural resources, if implemented for the other actions.

The contribution of the proposed project to these cumulative effects on cultural resources would be limited by the small amount (69.02 acres) of potential surface disturbance.

4.2 MIGRATORY BIRDS

Habitat within the project area supports low to moderate abundance and nesting density for migratory birds due to lack of surface water in the area. Disturbance from past, present, and reasonably foreseeable future actions (listed in Section 3.1), including the Proposed Action, may displace birds into adjacent habitats. Based on the low to moderate density, impacts to species stemming from resource competition (food, forage, cover) should be minimal. Impacts to migratory birds from dispersed recreation within the project area, as well as in areas of the Proposed Action that do not realize further development, would be intermittent.

Future geothermal development may result in additional minimal habitat loss when compared to total habitat available in the area. Geothermal development would include permanent loss of migratory bird habitat, habitat fragmentation, and noise impacts. Implementation of the EPMs for the Proposed Action, as discussed in Section 2.1.4, would also diminish impacts. Consequently, minimal incremental cumulative impacts would occur to migratory birds from the Proposed Action.

4.3 NATIVE AMERICAN RELIGIOUS CONCERNS

Over the last 15 to 20 years, BLM and the tribes have witnessed an increase in the use of lands, administered by BLM, by various groups, organizations, and individuals. New ways to utilize the public lands are also on the rise. Livestock grazing, pursuit of recreation opportunities, hunting/fishing, oil, gas, geothermal, and mining leasing, exploration and development, along with relatively “newer” uses such as OHV use, interpretive trails, and mountain biking are among many increasing activities within the BLM Stillwater Field Office administrative boundary.

In addition to all the existing, growing, and developing uses of the public lands, fluid mineral leasing and exploration would continue to contribute to the general decline in sites and associated activities of a cultural, traditional, and spiritual nature.

The traditional lands of the Paiute and Western Shoshone encompass the majority of the State of Nevada (including the BLM Stillwater administrative area). It is imperative that BLM and affected Tribes remain flexible and open to productive and proactive communication in order to assist each other in making decisions that would significantly reduce or eliminate any adverse affects to all party’s interests, resources, and/or activities.

4.4 VEGETATION

The combined past, present and reasonably foreseeable projects within the project area have or would impact vegetation resources by the removal of vegetation. In addition to the 8,324 acres that burned in 1999 and the 60 acres of existing disturbance, the Proposed Action would potentially disturb an additional 69.02 acres of mixed salt desert scrub, mixed sagebrush shrubland, and pinyon-juniper woodland in the project area. With the implementation of the EPMs for the Proposed Action, as discussed in Section 2.1.4, cumulative impacts to vegetation from past, present, and reasonably foreseeable future projects within the project area would be minimized.

4.5 WILD HORSES AND BURROS

Wild horses and burros have been or may be affected negatively by displacement or disruption of normal behavioral patterns due to past, present, and reasonably foreseeable future actions (listed in Section 3.1), including the Proposed Action.

Impacts from noise or surface disturbance associated with the Proposed Action could influence herd distribution and migration within and between the HMAs and impact forage and shelter resources. Wild horses and burros would likely shift their movements to avoid disturbance causing impacts to other areas in the HMAs due to limited forage and water availability.

The potential impacts to wild horse and burro populations would be minimized through compliance with county, state, and federal regulations, adherence to lease stipulations (Appendix A), implementation of the EPMs in Section 2.1.4, and the following recommended best management practices:

- Magma would ensure employees and site visitors avoid harassment and disturbance of wild horses and burros, especially during reproductive seasons. In addition, any pets would be controlled to avoid harassment and disturbance of wild horses and burros;
- Ponds, tanks, and impoundments containing harmful liquids would be excluded from wildlife access by fencing, netting, or covering at all times when not in active use; and
- Observations of potential problems regarding wild horses or burros, including animal mortality, would be immediately reported to the BLM.

4.6 WILDLIFE

Wildlife have been or may be affected negatively by displacement or disruption of normal behavioral patterns due to past, present, and reasonably foreseeable future actions (listed in Section 3.1), including the Proposed Action. Some of these projects and actions may increase traffic, conflicts with humans, and competition for habitat niches. Some of these actions may also decrease forage quality, quantity, and composition. Overall, the Proposed Action would

disturb a very small area separate from other projects in the project area, thus having a negligible contribution to cumulative effects.

In addition to the 8,324 acres that burned in 1999 and the 60 acres of existing disturbance, the Proposed Action would potentially disturb an additional 69.02 acres of mixed salt desert scrub, mixed sagebrush shrubland, and pinyon-juniper woodland habitats in the project area. With the implementation of the EPMs for the Proposed Action, as discussed in Section 2.1.4, cumulative impacts to wildlife from past, present, and reasonably foreseeable future projects within the project area would be minimized.

4.7 BLM SENSITIVE SPECIES

BLM sensitive species which may occur in the project area are based on areas of mixed salt desert scrub, mixed sagebrush shrubland, and pinyon-juniper woodland habitat types. Table 7 lists the BLM sensitive species with potential habitat, or potential to occur in the project area. Field surveys conducted in July 2009 and September 2010 did not document any sensitive plant or animal species within the project area. Two golden eagles were documented soaring over the project area, but no other sensitive wildlife species were identified. The Proposed Action would disturb up to 69.02 acres of land in addition to the existing 60 acres of road, historical mining, and grazing disturbance. Much of the land surrounding the project area is undisturbed and similar in habitat function.

BLM sensitive species may be displaced under the Proposed Action combined with past, present, and reasonably foreseeable future projects within the project area. In addition to the 8,324 acres that burned in 1999 and the 60 acres of existing disturbance, the Proposed Action would potentially disturb an additional 69.02 acres of mixed salt desert scrub, mixed sagebrush shrubland, and pinyon-juniper woodland in the project area. Impacts to BLM sensitive species are expected to be minimal.

4.8 MONITORING

The monitoring described in the Proposed Action is sufficient for the Proposed Action.

5.0 CONSULTATION AND COORDINATION

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5.2 PERSONS, GROUPS, OR AGENCIES CONSULTED

The following persons, groups, and agencies were contacted during the preparation of this document.

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Nevada Natural Heritage Program

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Fallon Paiute-Shoshone Tribe

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Rochanne Downs	Vice-Chair
Alvin Moyle	Chairman

U.S. Fish and Wildlife Service

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6.0 REFERENCES

- Barber, J.R., Crooks, K.R., and Fristrup. 2010. The costs of chronic noise exposure for terrestrial organisms. *Trends in Ecology and Evolution* 25 (3): 180-189.
- Barber, J.R., Fristrup, K.M., Brown, C.L., Hardy, A.R., Angeloni, L.M., and Crooks, K.R. 2009. Conserving the wild life therein: Protecting park fauna from anthropogenic noise. *ParkScience*, Vol. 26, No. 3, Winter 2009 – 2010. National Park Service, U.S. Department of the Interior, Natural Resource Program Center, Office of Education and Outreach.
- Bureau of Land Management (BLM). 2001. Consolidated Resource Management Plan Carson City Field Office, Carson City Nevada. May 2001.
- Bureau of Land Management (BLM). 2003. Nevada BLM Sensitive Species List. Unpub. Doc. Signed 7-1-03. Reno, NV.
- Bureau of Land Management (BLM). 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST-06/021+3071/REV 07. U.S. Department of Interior, Bureau of Land Management. Denver, Colorado.
- Bureau of Land Management (BLM). 2007b. IM-2008-050 Migratory Bird Treaty Act. Interim Guidance. Unpub. Doc. CCDO files. December 18, 2007.
- Bureau of Land Management (BLM). 2008. National Environmental Policy Act Handbook. BLM Handbook H-1790-01, Rel. 1-1547. U.S. Department of the Interior, Bureau of Land.
- Bureau of Land Management (BLM). 2008b. BLM Manual 6840, Special Status Species Management. U.S. Department of the Interior, Bureau of Land Management. December, 2008.
- Bureau of Land Management (BLM). 2009. Geographic Information System (GIS) Database. Geospatial Data. Nevada Fires 1999. Available online at http://www.blm.gov/nv/st/en/prog/more_programs/geographic_sciences/gis/geospatial_data.html.
- Bureau of Land Management (BLM). 2009a. Environmental Assessment, Fluid Mineral Leasing within Six Areas on the Carson City District. Churchill, Lander, Lyon, Mineral and Nye Counties, Nevada. January 2009. Sierra Front and Stillwater Field Offices.
- Bureau of Land Management (BLM). 2010. Instruction Memorandum No. 2010-156. Bald and Golden Eagle Protection Act. United States Department of Interior, Bureau of Land Management Washington D.C. July 9, 2010.
- Dellechiaie, F. 1977. Results of recent gradient drilling at the McCoy geothermal prospect, Nevada: AMX Exploration, Inc., IOM. December 21, 1977.

- Dellechaie, F. 1978. Mixing calculations for McCoy, Nevada: AMAX Exploration Inc., IOM. April 6, 1978.
- Garside, L.J. and Schilling, J.H. 1979. Thermal waters of Nevada: Nevada Bureau of Mines and Geology Bulletin 91, 163p.
- JBR Environmental Consultants, Inc. (JBR). 2010. Operations Plan for the McCoy Geothermal Exploration Project. Prepared for Magma Energy (U.S.) Corp. February 13, 2010.
- Magma Energy (U.S.) Corp. 2010. Email transmittal of drill pad locations for the McCoy Exploration Project. July 2010.
- Natural Resources Conservation Service (NRCS). 2010. Custom Soil Resource Report for Churchill County Area, Nevada, Parts of Churchill and Lyon Counties, obtained July 20, 2010, at <http://soils.usda.gov/>
- Nevada Department of Agriculture (NDA). 2009. Nevada Department of Agriculture, Plant Industry Division, Noxious Weeds List. Available at http://agri.nv.gov/nwac/PLANT_NoWeedList.htm.
- Nevada Department of Wildlife (NDOW). 2010. Internet Map Service, Geocortex IMF map viewer Wildlife ranges. Retrieved January 2010 from http://gis.ndow.nv.gov/imf/sites/ndow_public/jsp/launch.jsp?verify=true
- Nevada Department of Wildlife (NDOW). 2010a. Miscellaneous key game habitat maps – pronghorn. CCDO GIS files. Carson City, NV.
- Nevada Division of Environmental Protection (NDEP). 1994. State of Nevada Non-Designated Area Water Quality Management Plan, Handbook of Best Management Practices.
- Nevada Natural Heritage Program (NNHP). 2009. Data request letter correspondence for the McCoy Geothermal Exploration Project, July 22, 2009.
- Olsen, H.J., Dellechaie, F., Pilkington, H.D., and Lange, A.L. 1979. The McCoy Geothermal Prospect: Status report of a possible new discovery in Churchill and Lander Counties, Nevada; Geothermal Resources Council *Transactions*, v.3, p.51.15-51.18.
- Steward, Julian. 1938. Basin-Plateau Aboriginal Sociopolitical Groups. Smithsonian Institution Bureau of American Ethnology, Bulletin 120.
- Tingley, Joseph, V. 1998. Mining Districts of Nevada. Nevada Bureau of Mines and Geology. Report 47. Mackay School of Mines, University of Nevada Reno.
- University of Nevada, Reno (UNR). 2009. Nevada Bureau of Mines and Geology. Geothermal Resources of Nevada. Updated in 2008. Available online at: <http://www.nbmng.unr.edu/geothermal/gthome.htm>.

- U.S. Fish and Wildlife Service. 2008. Birds of Conservation Concern 2008. United States Department of Interior, Fish and Wildlife Service, Division of Migratory Bird Management. Arlington, Virginia. 85 pp. Available online at <http://www.fws.gov/migratorybirds/>
- Wildlife Action Plan Team. 2006. Nevada Wildlife Action Plan. Nevada Department of Wildlife, Reno.
- Willden, R. and R. Speed. 1974. Geology and Mineral Deposits of Churchill County, Nevada. Nevada Bureau of Mines and Geology Bulletin 83.

FIGURES

APPENDIX A

Geothermal Lease Stipulations

APPENDIX B

USFWS Threatened and Endangered Species Information